

Revival of Post-Independence and Contemporary Architecture for Human Causes

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Abstract—Architectural style is developed by analyzing environment, surrounding, people, resources, etc. Architecture have periods of various style with its architecture language of people. This paper discuss about the building impact on human by analyzing the building of post-independence time and contemporary architecture by taking Gwalior as a city to study. It will also discuss about the effective techniques and material used in the building to overcome the adverse climate.

Index Terms—Thermal comfort, Techniques, Orientation, Ventilation, Material.

I. INTRODUCTION

Architecture is a process of planning, designing and constructing building. As shelter is a basic architectural structure to protect humans, so it should be designed by considering the basic needs of human. The knowledge from traditional construction represent a way building fairly adapted to the climate, proper use of local materials, passive techniques, with proper orientation of the building, etc. With the increase in time these practices and researches also increased as there was continuous increase in population, needs of the people also increased and as land got extinct building start getting expand vertically. Modern architecture came with active techniques and new materials which have high durability, low maintenance and ease of construction like cement and steel which have replaced most of local materials. As living standard rise people start installing heating and cooling equipment's to improve their thermal comfort. Gwalior comprises of three sub parts i.e. Murar, Lashkar and city centre, where Lashkar comprises most part with old construction which comes under post-independence and city center buildings are of contemporary architecture. The objective is to study the orientation, material, and ventilation, thermal comfort of the building during the post-independence time and contemporary architecture of Gwalior city to analyze the positive and negative impact of the building on humans.

II. LITERATURE REVIEW

Gwalior city as a city is preferred due to various reasons. It being the rich and adverse architectural culture. The local material like stone is still being practiced in construction. Different kind of architectural element and technique can be

visualized in the building of post-independence time of Gwalior, like jali patterns and jhilmil windows which maintain the human comfort till now and are sustainable. Some contemporary building still represent the culture of Gwalior by using local material and technique.

A. Orientation

Orientation of the building is an important factor to acquire comfort in a building, as it decides the energy efficiency of the building. It is decided mainly considering the location and air flow as in different area there comes the difference in solar radiation. We should prefer to avoid over heating of the wall in such a way that orientation should be such that the minimum area is exposed to sun, north-south orientation of the main facades should be preferred. As excessive exposure to sun can cause many diseases like skin cancer, cataracts and other eye diseases.

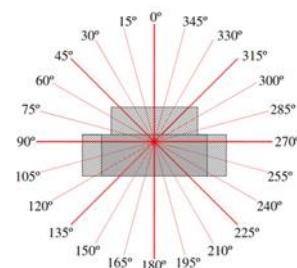


Fig. 1. Orientation of the building (value is north direction).

TABLE I
CORRELATION BETWEEN DEGREE AND FACADES

ORIENTATION	MAIN FACADE	REAR FACADE
0	SOUTH	NORTH
45	SOUTH-WEST	NORTH-EAST
90	WEST	EAST
135	NORTH-WEST	SOUTH-EAST
180	NORTH	SOUTH
225	NORTH-EAST	SOUTH-WEST
270	EAST	WEST
315	SOUTH-EAST	NORTH-WEST
360	SOUTH	NORTH

B. Ventilation

Ventilation is also an important factor as it provide healthy air for breathing. There are mainly two types of ventilation:

1. Natural ventilation
2. Mechanical ventilation

Natural ventilation like windows, doors, solar chimneys, wind towers, ventilators, etc. are essential element in building for human. It provides circulation of outdoor fresh air inside the building which is very important for human to inhale. Its size and type of opening in building depends on climate, building design and human behavior. In contemporary architecture natural ventilation is replaced by mechanical ventilation system like fans, air conditioning system, etc. Mechanical ventilation also require careful design, maintenance and it is economically high. It also have resolved problems faced by natural ventilation but should be used in a limit because it also have an impact on human health.

C. Materials

Material is a factor which needs to give more attention to choose as it decides the thermal performance of the building which decides the comfort level of the building which makes human comfortable to live. As material provides insulation to the building so it should be decided in such a way that it maintain the inner surface temperature for better comfort and reduce the amount of energy used for heating.

D. Techniques

During the time of post-independence, passive techniques were the only way to maintain comfort level of the building but now technical means are followed which ignore the climate. Among both the techniques passive techniques are more sustainable than active, also active technique uses a lot of resources and also they have a negative impact on humans.

III. CASE STUDY

A. Building During the Time of Post-Independence



Fig. 2. Residential building in Naya Bazaar, Gwalior, India depicting the construction during the time of post-independence, constructed with the use of local material stone and the culture depicted by Jali's and Arch windows

Residential building of Gwalior during the time of the post-independence were of local materials like stone and were also constructed by maintaining the thermal comfort. Stone provides natural elegance to the building which is sustainable and ecofriendly. It represents the culture of the city, its own

distinctive color which creates a natural environment and keeps humans feel fresh and happy, natural color is also fire resisting. Stone construction also requires skilled labor for the construction. Stone walls are thicker which maintain the thermal comfort of the building and it keeps the inside environment cool during summer and hot during winter. Buffer zones were also created between the arch shape openings and rooms so that no direct radiation comes inside which maintains the inner temperature. Stone jaali's were also used. Some buildings of post-independence time do not have proper orientation because of which they have used glass windows to cover the openings. So, the interpretation made is the residential building during the time of post-independence were constructed by considering the human as it maintains the thermal comfort by using sustainable material, orientation of the building, proper ventilation and also different passive techniques, which helps humans in many ways like why keeping humans safe from solar radiation, less use of resources, etc.



Fig. 3. Residential building in old high court, Gwalior, India

B. Building during the time of Contemporary Architecture

Contemporary Architecture came in search for traditional solution modification with new technologies. There came the whole processing in the building color, proportion, texture, shape, material, etc. There came more stable material from which high rise can be constructed. Aesthetic is also one of the important factors of contemporary architecture. Materials used in these types of buildings were brick, concrete, steel, wood, etc. Concrete is used in most of the residential buildings as the main material. It provides strength and durability to the building. It is a very good insulating material which helps in maintaining the inner temperature.

It also has good acoustic quality. But concrete is the largest consumer of natural resources (water, sand, gravel and crushed rock). It also has high embodied energy, raw materials are limestone, clay and iron ore. Concrete has 5% of the total emission of greenhouse gases due to the emission of CO₂ during the manufacturing process which has a great impact on humans. So, the interpretation made by the buildings of contemporary architecture is that they are not constructed properly by considering orientation, ventilation is in such a way that thermal comfort is maintained by using active strategies which is not good for human health.



Fig. 4. Residential apartment in City Centre, Gwalior, India

IV. CONCLUSION

The building of post-independence and contemporary

architecture include different types of elements with different thermal capacity and insulation and have both positive and negative impact on human. There can be a better construction process by combining these two type of architecture by using proper passive and active techniques to a limited extent and considering human as the important part of designing as all the buildings are designed for them.

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